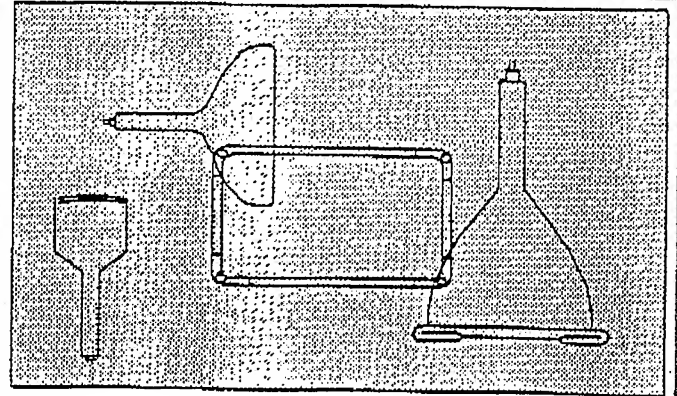


# CLINTON ELECTRONICS CORPORATION

6701 Clinton Road  
Rockford, IL 61111  
(815) 633-1444

**CRT TYPE: 678**



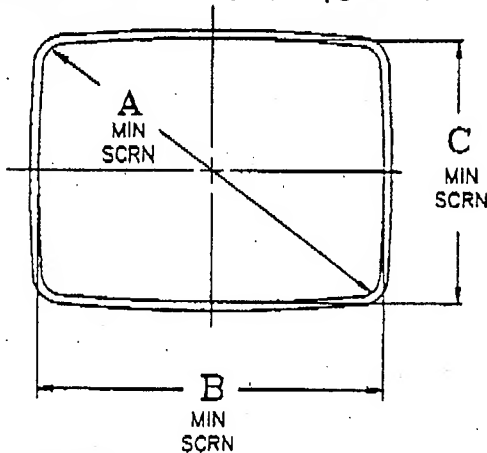
**7" RECTANGULAR  
HIGH RESOLUTION**

**90 DEG DEFLECTION  
LOW VOLTAGE FOCUS**

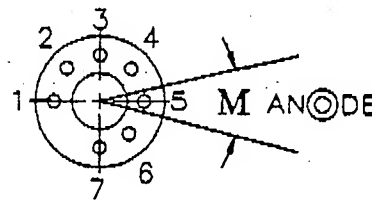
**.788" NECK  
CATHODE RAY TUBE**

SCREEN DIMENSIONS

CLINTON PIN CE 678W 7P31VJ

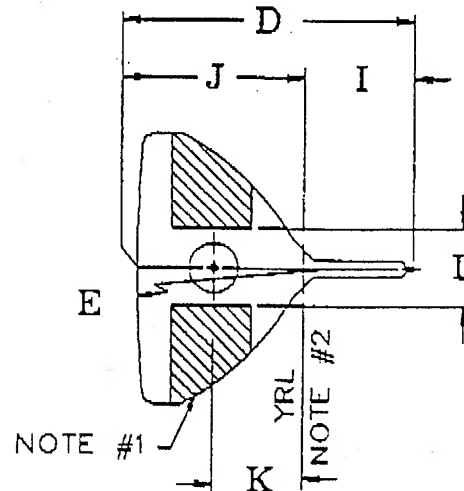
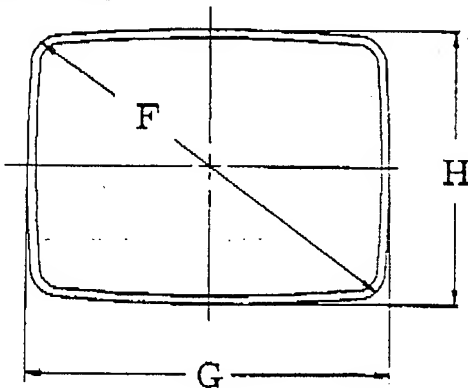


BASING BOTTOM VIEW



- 1-GRID 1
- 2-CATHODE
- 3-HEATER
- 4-HEATER
- 5-GRID 1
- 6-GRID 2
- 7-GRID 4

BULB DIMENSIONS



SCREEN DIMENSIONS  
DIAGONAL MAJOR MINOR

	A	B	C
INCHES	6.90	5.72	4.598
METRIC	175.3	145.3	116.8
TOLERANCE	MAX	MAX	MAX

OVERALL  
LENGTH

FACEPLATE  
RADIUS

D	E
7.843	FLAT
199.2	
±.250"	SPHERICAL(NOM)

BULB DIMENSIONS  
DIAGONAL MAJOR MINOR

	F	G	H	I	J	K	L	M
INCHES	7.526	6.346	5.220	4.062	3.781	1.50	2.625	
METRIC	191.16	161.19	132.59	103.2	96.0	38.1	66.68	
TOLERANCE	±.10"	±.10"	±.10"	±.12"	±.12"	±.12"	±.12"	±.15"

Clinton Electronics Corporation reserves the right to alter these specifications without prior notification.

REVISION B

May 24, 1990

## 1.0 DESCRIPTION

The 678 is a 7" diagonal, 90 deg magnetic deflection, 20mm diameter neck, low voltage focus, cathode ray tube designed for high resolution alpha-numeric and video displays. This tube is designed with a 12.0V/75mA heater.

## 2.0 ELECTRICAL DATA

2.1 FOCUSING METHOD..... Electrostatic

### 2.2 DEFLECTION

DEFLECTION METHOD..... Magnetic

#### DEFLECTION ANGLES

Diagonal..... 85°

Horizontal..... 82°

Vertical..... 67°

### 2.3 DIRECT INTERELECTRODE CAPACITANCES

Cathode to all other electrodes..... 3.0 pF Typ 4.0 pF Max

Grid #1 to all other electrodes..... 6.5 pF Typ 7.5 pF Max

External conductive coating to anode(note#3)..... 100 pF Min 500 pF Max

2.4 HEATER VALUES (nominal)..... 75 mA @ 12.0 V

## 3.0 OPTICAL DATA

### 3.1 PHOSPHOR (Aluminized)

For specific phosphor information, refer to "CLINTON Phosphor Data Sheet"

### 3.2 FACEPLATE

Light Transmission (approximate)(NOTE #4)

Light tint..... 51 %

Dark tint..... 36 %

For faceplate treatments refer to CLINTON Specification: CS115

## 4.0 MECHANICAL DATA

For mounting systems refer to CLINTON mechanical specification: CS134

### 4.1 BULB

EIA Designation (or equivalent)..... NONE

Bulb Contact (EIA Designation)..... J1-21

Base (EIA Designation)..... E7-91

Basing (EIA Designation)..... 7GR

## 4.2 AGENCY APPROVALS

SYSTEM	AGENCY	NUMBER
T-band with ears	UL/CSA/VDE	CEULL1303TE
Rim band	NONE	N/A
Shell bond	NONE	N/A
Panel w/T-band + ears	UL/CSA	CEULL1303TEI

## 5.0 RATINGS (Absolute Maximum Operating Ratings)

Clinton does not recommend tubes be operated at Maximum conditions. Unless otherwise specified, voltage values are measured with respect to the cathode.

5.1 VIEW SCREEN VOLTAGE..... <sup>8 KV</sup>~~10.0~~ KV Min 14.0 KV Max

5.2 GRID #4 (Focus Voltage)..... -500 V Min 1100 V Max

### 5.3 GRID #2

For fixed grid #2 operation ..... 300 V Min 800 V Max

For fixed grid #1 operation ..... 200 V Min 800 V Max

### 5.4 GRID #1 VOLTAGES

Instantaneous (non-repetitive)

Positive Peak..... 0 V max

Negative Grid #1 Voltage..... -210 V Max

Maximum Drive Voltage (note #5) 2A/cm<sup>2</sup>..... 43 V Max

### 5.5 HEATER VOLTAGES

Negative Heater to Cathode Voltage During

Warm Up Period Not to Exceed 15 Seconds..... -450 V Max

After Equipment Warm Up..... -200 V Max

Positive Heater to Cathode Voltage..... 200 V Max

Operating Heater Voltage (DC or RMS) (note #6)..... 12.0 V  $\pm$  5%

5.6 MAX. grid circuit resistance not to exceed 1.5 Meg Ohms

## 6.0 TYPICAL OPERATING CONDITIONS

Unless otherwise specified, voltages are measured with respect to the cathode with cathode at ground

6.1 VIEW SCREEN VOLTAGE..... 12.0 KV

### 6.2 OPERATION AT CONSTANT CUT-OFF

Conditions for constant cut-off

Grid #1 voltage for cut-off (note #7)..... -65 V

Grid #2 voltage range..... 380 V Min 770 V max

Drive Voltage (note #5) ..... 25 V

Cathode Current..... 75  $\mu$ A (Nom)

Focus Voltage Range	
Best Overall Focus Voltage.....	0 V to 400 V
Center Focus Voltage.....	-100 V to 300 V
Dynamic Focus Voltage (note #8).....	225 V (Nom)
Center Line Width (note #9).....	.0082 in (Nom)
	.2082 mm (Nom)

### 6.3 OPERATIONS AT CONSTANT GRID #2 VOLTAGE (NOTE #10)

Grid #2 voltage.....	600 V
Grid #1 cut-off voltage range (note #7).....	-52 V to -95 V
Cathode cut-off voltage range.....	46 V to 86 V

### 6.4 HEATER BIAS (note #6)

With respect to cathode, not to exceed.....	0 V to -50 V
Bias at nominal value .....	12.0 V

## 7.0 SCREEN QUALITY

7.1 Screen Quality in accordance with Clinton Manufacturing Specification number CS106.

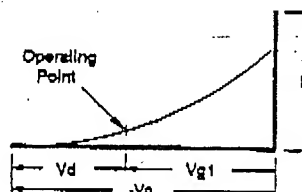
## 8.0 UNDEFLECTED SPOTLAND

8.1 Maximum deviation from the mechanical center is .250" Rad.

8.2 Undeflected spot land is measured in accordance with Clinton Manufacturing Specification CS120.

## 9.0 OPERATING CHARACTERISTICS

$V_d$  = Drive Voltage  
 $V_{g1}$  = Grid #1 Bias Voltage  
 $V_c$  = Grid #1 Voltage cutoff  
 $I_c$  = Cathode Current  
 $\gamma = V_d/V_c$



## NOTES

- 1) External conductive coating and mounting hardware, if used, must be grounded. Pattern outline is for reference only. Actual pattern can deviate from outline shown.
- 2) Determined by plane where EIA G-156 contour reference gauge will stop.
- 3) Measured with implosion hardware, if any, connected to external coating.
- 4) This specification applies to a bare faced tube.
- 5) Drive voltage = | Grid #1 voltage for visual extinction of focused undeflected spot | minus | Grid #1 bias voltage |. For optimum life considerations reduced drive voltage must be used for high cathode duty cycle applications.
- 6) For optimum life considerations, it is recommended that the heater be operated as specified and not allowed to float and biased as specified in paragraph 6.4

- 7) Grid #1 voltage for visual extinction of focused, undeflected spot.
- 8) Dynamic focus = corner focus voltage minus center voltage.
- 9) Line width is the 63% amplitude point of line profile (with raster retrace blanking applied).
- 10) Under these conditions, sizeable variations in spot size and light output can be expected due to cut-off variations.

## 10.0 X-RAY EMISSION

### 10.1 X-RADIATION REFERENCE POINT

The maximum anode voltage at which the X-Radiation emitted from this tube will not exceed 0.5mR/hour at 250uA anode current is 19.0 KV

### 10.2 X-RADIATION CHARACTERISTICS

The X-Radiation emitted from this display tube, as measured in accordance with the EIA Publication No. RS-501 (current revision) will not exceed 0.5mR/hour throughout the useful life of the tube when operated within regulation limits of a hypothetical power supply with a 5M ohm internal impedance, as shown by Figure XM-36. The tube should not be operated beyond its' Design Maximum Rated Anode Voltage, but its' X-Radiation will not exceed 0.5mR/hour for anode voltage and current combinations given by the Iso Exposure Rate Limit Characteristics as shown in Figure XM-36. Operation above these values shown by the curve may result in failure of the display unit to comply with the Federal Performance Standard for Television Receivers (21 CFR Subchapter J.). Maximum X-Radiation as a function of anode voltage at 250uA anode current is shown by the curve of Figure XM-35. X-Radiation at constant voltage varies linearly with anode current.

Figure XM-35

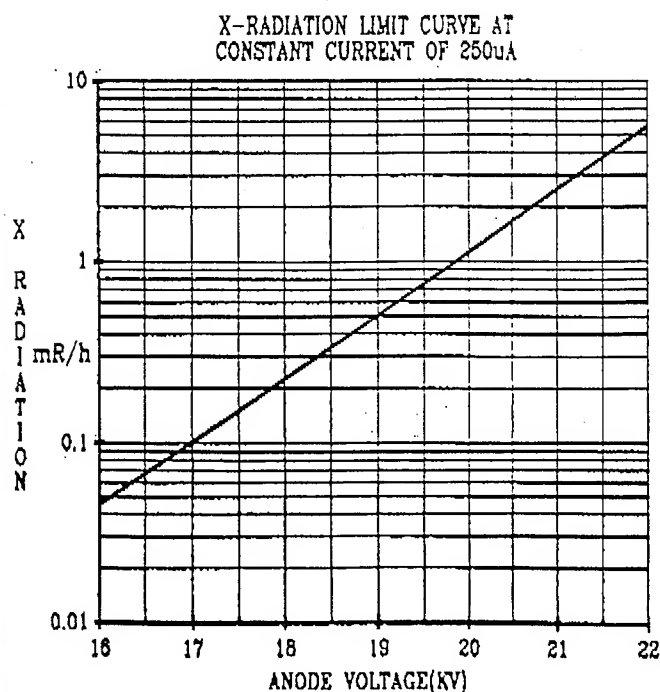
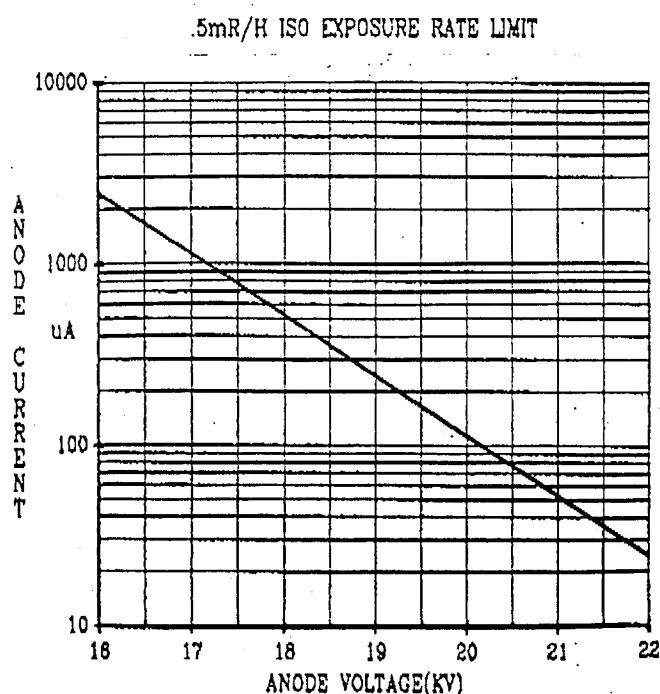
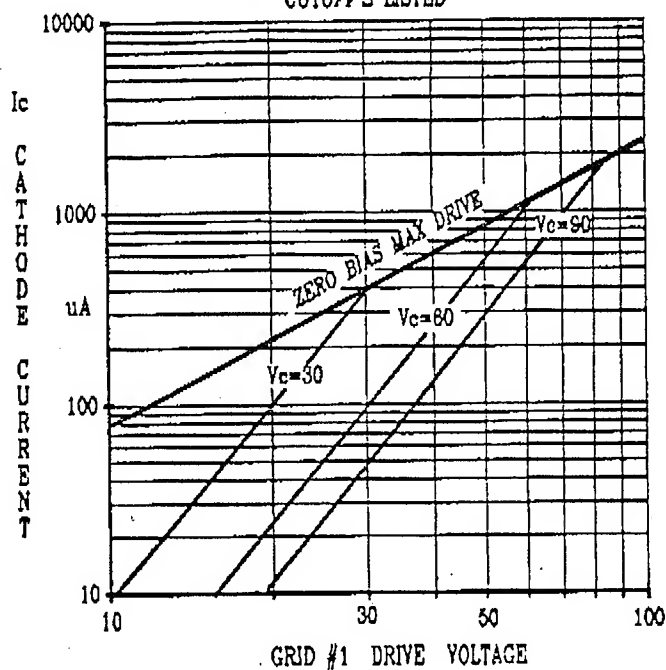


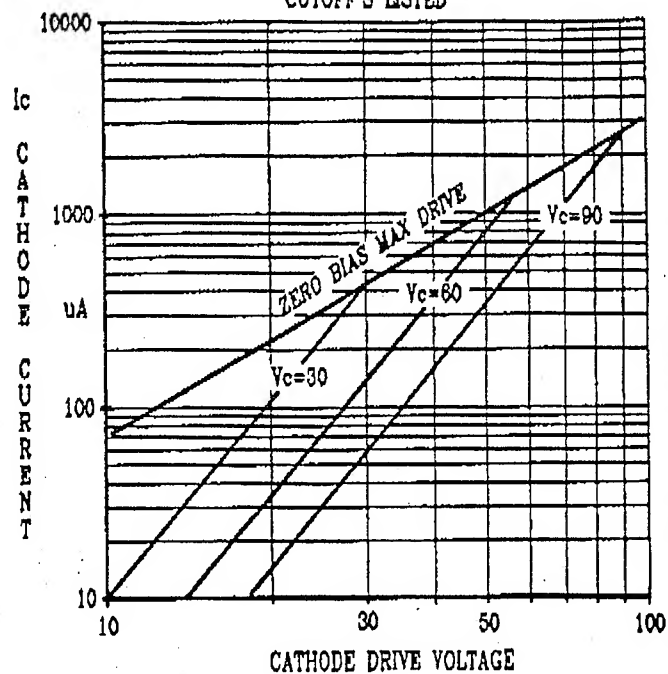
Figure XM-36



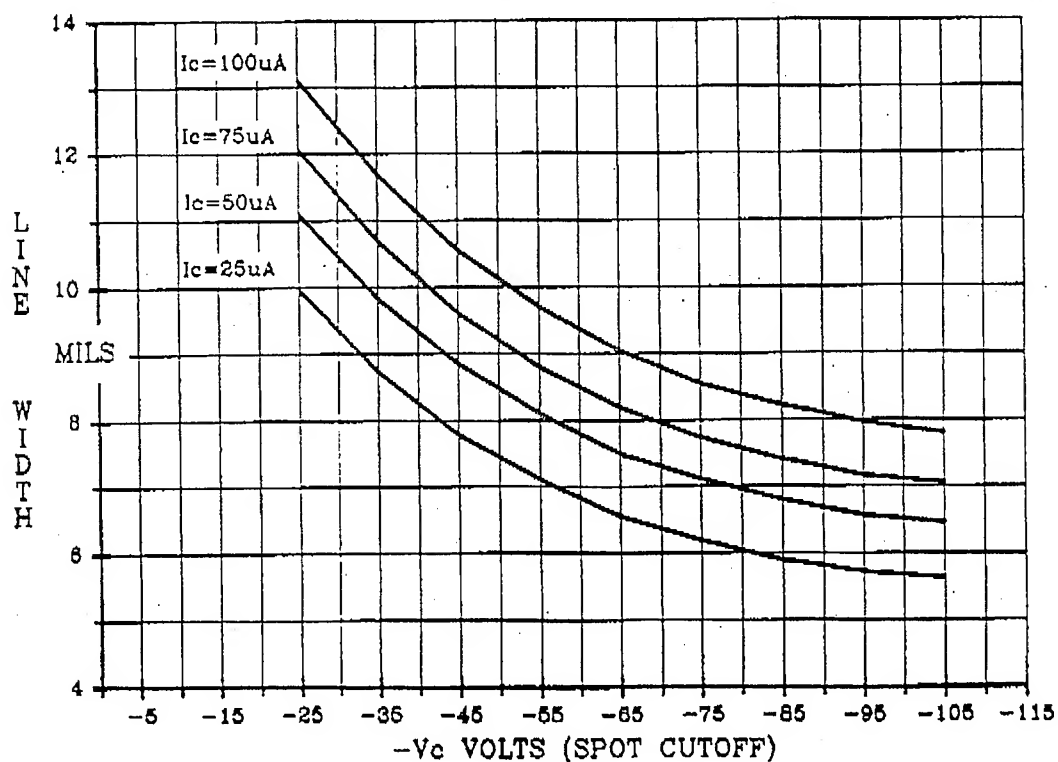
TYPICAL CATHODE CURRENT WHEN  
GRID #1 OF TUBE IS DRIVEN FROM  
CUTOFF'S LISTED



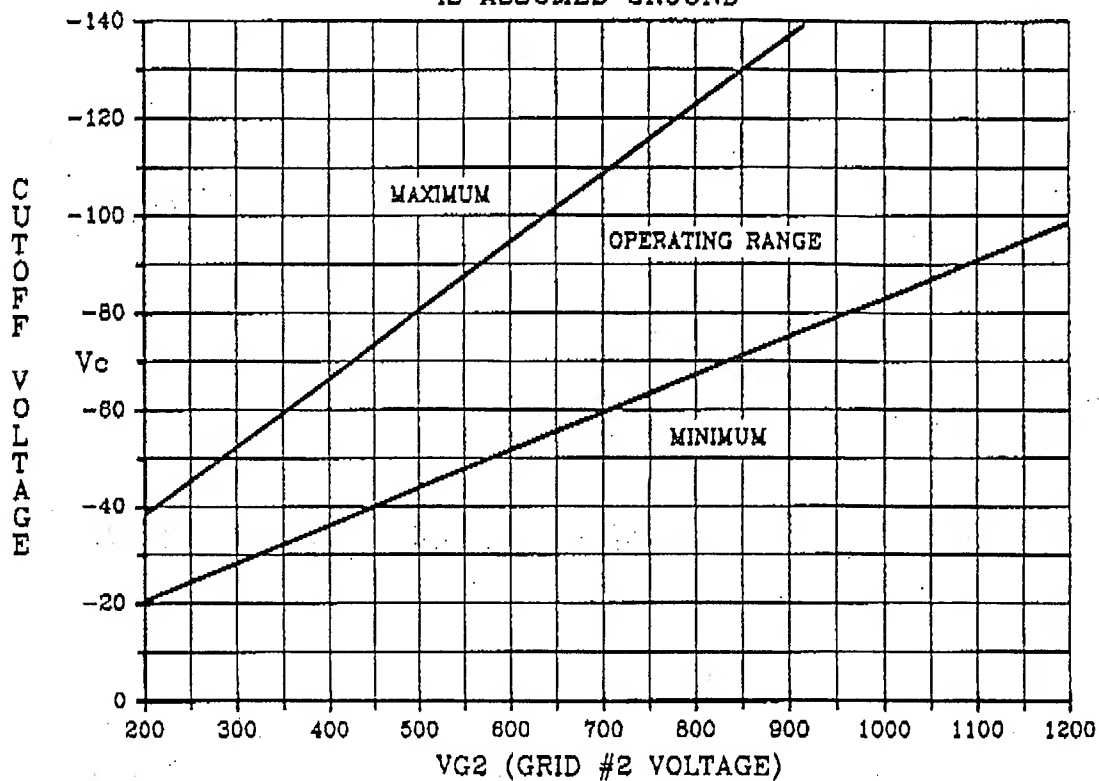
TYPICAL CATHODE CURRENT WHEN  
CATHODE IS DRIVEN FROM THE  
CUTOFF'S LISTED



LINE WIDTH VS. CUTOFF VOLTAGE AT  
CONSTANT CATHODE CURRENT



GRID #1 VOLTAGE NECESSARY TO  
EXTINGUISH A FOCUSED SPOT CATHODE  
IS ASSUMED GROUND



CATHODE VOLTAGE NECESSARY TO  
EXTINGUISH A FOCUSED SPOT GRID #1  
IS ASSUMED GROUND

